

Reading: Next week will continue the coverage of Chapter 3, sections 3.1–3.3. **Also read Section 7.2** (pp 313–321 in Sebesta 7, pp 293–301 in S6), which supplies *examples* and *motivations* that should really go with the Chapter 3 material. For next Friday into the following week, read my notes on “Stages of Compilation” while *skimming* Chapter 4. You may skim or skip sections 3.4–3.6, which IMHO are too technical too soon and distract from the natural flow of the course. Also read links on C# on the course webpage and examine the sample programs in `~regan/cse305/LANGUAGES/C#/LECREC07/` on fork or yeager, beginning with the `Ch2example` ones.

This problem set is for in-class handwritten submission, not on-line submission. One reason is that some of the questions ask you to draw pictures (i.e., derivation trees).

(1) Text, ch. 3, exercise 7 on p171 (same exercise, p157 in Sebesta 6), parts (b,c,d) only. You may use reasonable shortcuts like “ \implies^3 ” to save steps in the derivations, but not the trees.

Note change: On (d), rather than draw a leftmost derivation in this grammar (which would be rather lengthy even with shortcuts), do the following: (i) From your parse tree, say how many lines there would be in the leftmost derivation. Then (ii) give a leftmost derivation in the *ambiguous grammar of Example 3.3*, and compare this to the estimated length of the other derivation. (6+6+6 = 18 pts.)

(2) Text, ch. 3, exercise 11 on p171. **Say what the language is**, giving a definition in precise English prose beginning “the set of all a-b strings x such that...” and then answer (a)–(d). (18 pts.)

(3) Text, ch. 3, exercise 13 on p172 (same exercise number, p158 in S6). Your answer should be less than 15 characters long! Please don’t “blab” it to others. (You will have a more-sophisticated question of this type on the next problem set. 9 pts.)

(4) Translate the following three expressions into both Cambridge Prefix and standard Postfix notation. In (c), treat `sqr` and `sqrt` as unary functions, and `div` as a binary function of lower precedence than the others. Would it matter to your answer if we wrote `div` as a prefix rather than infix binary function, e.g. if we gave you `div(x, sqrt(sqr(y) + sqr(z)))`? (You should have 6 expressions plus a yes/no answer with a brief explanation, for 21 pts. total and 66 total pts. on the set.)

(a) $x + 2 - (y + 3 - (z + 4))$

(b) $5*x + y*3/(z/x)$

(c) `x div sqrt(sqr(y) + sqr(z))`